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A Creative Problem Solving Toolkit for Mild Traumatic Brain Injury Survivors

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A Project in the Creative Studies Program

by

Miriam S. Hoffman

Submitted in Partial Fulfillment
of the Requirements
for the Degree of
Master of Science

December 5, 2014

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Dates of Approval:

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Abstract of Project*A Creative Problem Solving Toolkit for Mild Traumatic Brain Injury Survivors*

Rebuilding and recreating one's mental and physical life after traumatic brain injury is one of the most daunting of human experiences. At the same time, this is a perfect opportunity to adopt a creative life. With a mumble-jumble of seemingly random thoughts without much rhyme nor reason post-TBI, retraining one's brain to deliberately establish a "new normal" life can be enhanced with the deliberate process of Creative Problem Solving. Working with a balance of divergent and convergent thinking, the major premise of creative problem solving, in and of itself, provides an initial framework for post-TBI brain re-training. While many of the tools commonly associated with CPS are too complex to be assimilated into a program of post-TBI brain retraining, some tools, with little modification, provide valuable pieces of a framework for post-TBI brain training. This project outlines the beginnings of a Do-It-Yourself program for TBI survivors incorporating the principles of creative problem solving and some of the existing CPS tools with others developed from my experience and the input of other TBI survivors.

Key words: Traumatic Brain Injury (TBI), cognitive training, problem solving, learning model, thinking skills, post-brain injury retraining

Date

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To my late mother, Charleen M. Hoffman, a longtime elementary school teacher, who often reminded me that some of us choose to be teachers, but all of us continue to remain students.

To my late cousin, Ronald M. Beeck, who represented the best and the brightest of our generation, who died in service during the Vietnam War. Finding your name on the Vietnam Memorial in Washington, D.C. provided another cornerstone of this project.

To Martha Raye, who entertained generations of soldiers in USO shows and never turned down a veteran who had a story to share. Maggie, your generosity inspires me every day.

I would like to thank the ICSC staff, especially John Cabra, who suggested the idea of this project to me one lonely November morning shortly after I had laid my father to rest. I would also like to thank Mike Fox for guiding me to the end of the academic portion of this project.

Very special thanks to all those veterans and other Traumatic Brain Injury patients who inspire me to do this work and to share my post-TBI experience. The extent of my gratitude for your service and your extraordinary efforts making your way back into civilian life cannot be expressed in mere words.

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SECTION ONE:

BACKGROUND OF THIS PROJECT

Introduction

Debi: You know what you need?

Marty: What?

Debi: Shakubuku.

Marty: You wanna tell me what that means?

Debi: It's a swift, spiritual kick to the head that alters your reality forever.

Marty: Oh, that'd be good. I think.

(Arnold & Burnham, Armitage, 1997)

Skakubuku is one way to define traumatic brain injury, a swift kick to the head. The split second of a mTBI injury can rock a person to the core and set one on a profound journey to recover, restore, relearn, re-train, and rebuild mind, identity, mind, and physical well-being. This process is nothing sort of the most single creative act any person can undertake. To start from a point where nothing is automatic and almost everything needs to be relearned is the biggest do-it-yourself (DIY) project many of us will ever undertake.

Definitions of Traumatic Brain Injury

Traumatic brain injury is defined as:

-The application of external physical forces to the brain including acceleration/deceleration and/or blast-related forces.

-The forces applied *produce immediately apparent physiological disruption of brain function and/or structure*, usually evidenced by an alteration of mental state and/or sensorimotor impairments.

-The alteration of mental state and/or sensorimotor impairments *results in at least transient functional disability* (Arcinegas, et al., 2014). Long story short, it is, in effect, a swift kick to the head.

Worldwide, TBI affects over 5 million people per year, concentrated mostly in the U.S. (1.5 million) and India (1.5 to 2 million). These injuries are divided into 4 classifications, penetrating, severe, moderate and mild, dependent on the severity and loss of consciousness as evidenced in the Glasgow Coma Scale. (Arcinegas, et al., 2014).

Table 1. Initial criteria for assessment of traumatic brain injury

Severity Rating for TBI

Traumatic Brain Injury Description

Severity	GCS	AOC	LOC	PTA	Imaging
Mild	13-15	≤24 hrs	0-30 min	≤24 hrs	Neg
Moderate	9-12	>24 hrs	>30min <24 hrs	>24hrs <7 days	Pos or Neg
Severe	3-8	>24hrs	≥24 hrs	≥7 days	Pos

GCS- Glasgow Coma Score AOC- Alteration in consciousness
 LOC -Loss of consciousness PTA- Post-traumatic amnesia

Adapted from <http://dvbic.dcoe.mil>

Severity of and recovery from TBI is affected by three separate sets of factors. 1) Pre-injury factors include but are not limited to smoking, alcohol and substance consumption, education, mental condition, previous injuries, age and diet. 2) Injury factors, including but not limited to cranial location of the injury, the speed and the nature of the specific impact and comorbidities concurrent injuries. 3) Post-injury factors including but not limited to time elapsed before diagnosis and treatment, socio-economic factors, which constitute substantial long-term effects on generations of families of TBI survivors (Noble, 2014). The overall socio-economic costs of a single TBI cannot be measured only in terms of the individual injury. In effect, what happens to one of us happens to all of us. Symptomatically, post-injury symptoms present themselves in varying degrees in terms of four basic classifications: 1) cognition, 2) emotion, 3) behavior, and 4) sensorimotor function. The most common among traumatic brain injuries are concussions, also known as mild traumatic brain injuries (mTBI). The classification *mild* can be somewhat misleading in that the severity of these injuries may widely vary. The cognitive and behavioral effects of mTBI can range from a couple of hours to a number of months, even years.

Thinking/ Remembering	Physical	Emotional/ Mood	Sleep
Difficulty thinking clearly	Headache Fuzzy or blurry vision	Irritability	Sleeping more than usual
Feeling slowed down	Nausea or vomiting (early on) Dizziness	Sadness	Sleep less than usual

Difficulty concentrating	Sensitivity to noise or light Balance problems	More emotional	Trouble falling asleep
Difficulty remembering new information	Feeling tired, having no energy	Nervousness or anxiety	

Table 2: Symptoms of concussion

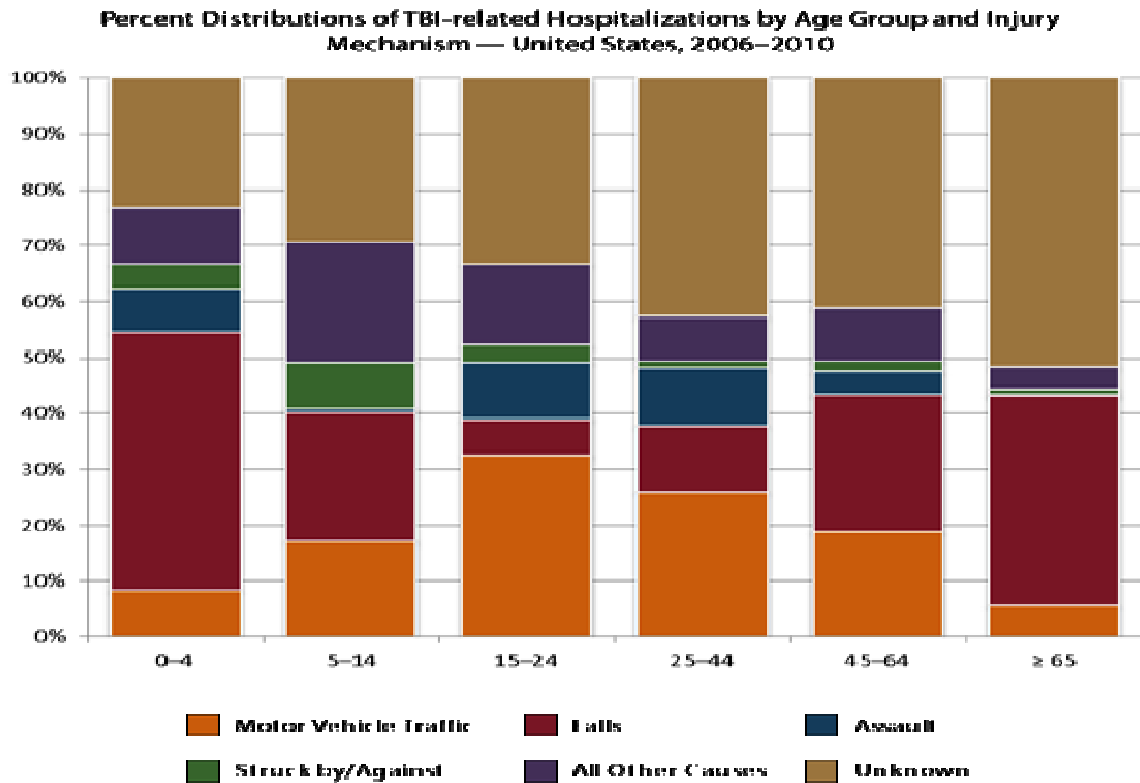
Adapted from What are the Signs and Symptoms of Concussion? (2014)

The Statistics of Traumatic Brain Injury In America

While I started this work concentrating on the over 300,000 TBI patients currently in treatment in the Veterans Administration System (Martin, et al. 2008) (Taniellian & Jaycox, 2008), some of whom I have developed a great affinity, I soon realized that the extent of TBI in the U.S. far exceeds the number of those in the VA. As stated earlier, there are over 1.5 million TBI’s occurring every year here occurring during motor vehicle accidents, assaults, strikes, and falls. In 2010, about 2.5 million emergency department (ED) visits, hospitalizations, or deaths were associated with TBI—either alone or in combination with other injuries—in the United States. TBI contributed to the deaths of more than 50,000 people. TBI was a diagnosis in more than 280,000 hospitalizations and 2.2 million ED visits. These consisted of TBI alone or TBI in combination with other injuries. Over the past decade (2001–2010), while rates of TBI-related ED visits increased by 70%, hospitalization rates only increased by 11% and death rates decreased by 7% (How Big is the Problem., 2014).

Worldwide Traumatic brain injury is the major factor in disability. The socio-economic costs associated with TBI are staggering and catastrophic to survivors and their families (Hyder, et al., 2007). The advances in post-trauma diagnosis and care lead to a higher survivability rate (Signorini, et al, 1999). Conversely, survivability is not without its costs. While the vast number of IED casualties in OEF and OIF conflicts in Iraq and Afghanistan have garnered a great deal of publicity in the past decade, these brave soldiers represent only a segment of the worldwide population affected by traumatic brain injury.

Table 3



Adapted from “Injury & Prevention Control: Traumatic Brain Injury”(2014)

This chart illustrates the high incidence of hospitalizations due to falls among the youngest and oldest age groups and a significantly higher incidence of TBI's occurring due to MVA's in the middle age groups. The incidence of TBI from unknown causes increases with age. This can be attributed to numerous factors and can be accompanied by numerous comorbidities and overlooked initial diagnoses. This chart does not account for TBI's sustained in combat in Operation Iraqi Freedom and Operation Enduring Freedom. While combat and sports injuries make up the bulk of the news stories associated with traumatic brain injury, the statistics tell a much more widespread story.

Traumatic Brain Injuries, particularly mild Traumatic Brain Injury, the effects of which can range from a recovery that lasts only a few days to Post-Concussive Syndrome which can last months and even years, are considered to be the invisible wounds of war. Many, many survivors of TBI, both military and civilian, go about their lives without a visible mark on them. They are among the loneliest casualties of war and civilian accidents and incidents. TBI, particularly mTBI, is not only the invisible wound of war but the invisible injury of everyday life. So many everyday tragic incidents involve the lasting effects of TBI. So much of this story is undiagnosed and is left untold.

The Purpose of a CPSS/TBI Toolkit

“Life isn't about finding yourself. Life is about creating yourself.”

— George Bernard Shaw

When one's life is little more than a jumble of incomplete memories and feeble attempts at physical tasks that once were effortless, every single thought and motion can be creative. Divergent thinking is part and parcel of post-TBI life. Thoughts flutter through one's brain with no rhyme or reason. Everyday things seem simultaneously foreign and familiar. Sifting through this murk and mire trying to make reasonable sense of everyday problems can appear to be insurmountable. Much anxiety mounts in the effort to recover what has been lost. Memories, routines, and connections all seem only vaguely familiar. "The only way we have of influencing the future is to own the present, however we find it," writes Jon Kabat-Zinn in the introduction to his book, *Full Catastrophe Living* (Kabat-Zinn, 1990, p. XXVIII). Starting where you are, wherever you find yourself at the crux of this toolkit. There is no placement test to qualify for using these tools. Recovery from TBI, any kind of TBI, starts with a single step. These tools have been designed to accompany these steps, whether it be a first step out of the house or walk back to work. The process of using these tools remains the same and is set forth to provide guideposts in a post-injury world that can be confusing and overwhelming. It is my sincere hope that these tools find their place among a host of others as tools of active learning of skills seemingly lost in an instant. In post-TBI life as in life in general, pain and suffering are inevitable. A single universal response is not.

The men and women who are service veterans, and for that matter, all TBI survivors are more apt to thrive in a situation that emphasizes training rather than rehabilitation. By no means, is this meant to devalue the treatments and therapies necessary TBI recovery. Particularly in the Veterans Administration, there is an enormous effort being made to not repeat the scenarios associated with PTSD and Agent

Orange associated with the Vietnam War. The Human Connectome Project (www.humanconnectome.org) put forth by the U.S. Federal Government has yielded tremendous interest in the workings and architecture of the brain and put in place a vast number of new advances in neuroimaging and neuroscience that propel early treatment and recovery well beyond what was considered state-of-the-art even a couple of years ago. Neuroimaging studies are published with blazing speed, tremendous scope and numerous series of colorful brain images that excite all of us interested in thinking and idea generation.

Incorporating what I learned on my own post-TBI experience, what I have learned from other TBI survivors and what I have learned over the course of my study of creativity, I have developed a CPS toolkit designed to address the four most common challenges associated with mild TBI: 1) sensory motor issues, 2) emotional inhibition and control, 3) cognition and learning, and 4) memory. In developing this DIY CPS TBI toolkit, I tried to distill the essence of each individual CPS tool to keep in mind the limited attention span that accompanies TBI. I wanted to design something portable that TBI survivors could use inconspicuously without drawing much attention. I wanted to incorporate kinesthetic learning into as many tools as possible, keeping in mind the lessons learned from Dave Meier's workshops in Accelerated Learning (D. Meier, San Diego, 2011), research on neuroplasticity (Markham & Greenough, 2004) and research on exercise and brain function, (Gemmell, 2006; Griesbach et al., 2004, 2007, 2009; Wieloch & Nikolich, 2006). I wanted to keep it all very simple, readily useable, and easily repeatable. Recovery from Traumatic Brain Injury, however mild, can extend months and years and troublesome symptoms can recur without warning. Individual tools

in this toolkit have been designed to used by themselves or "stacked" to work on more complex problems. This CPS/TBI toolkit will provide training to live better with a TBI and to use the survivor's "new normal" rather than getting used to it. The design of this toolkit shifts the paradigm from practitioners, prescriptions and patients to participants, practice and progress.

My Personal Rationale

Nearly seven years ago, on December 20, 2007, I was having one of the best days of my life. Over the course of the year, in the throes of the impending financial and mortgage crisis, I had had three failed closings on the sale of my house in the Bucktown neighborhood of Chicago. My personal possessions had been in storage since February of that year. I had also missed out on two potential "dream houses", on which I had presented offers contingent on the sale of my then-current house. On that day, I had gotten a phone call from a representative from Wells Fargo Bank who assured me that the pending offer on my house was absolutely going to close on the following day, December 21, 2007. To celebrate the impending closing of the sale of my house, I went to a Tai Chi class. On the way home I bought 6 2-liter bottles of soda for my contribution to a potluck with the wardrobe crew at the Joffery Nutcracker at the Auditorium Theatre. I decided to take a cab rather than to haul all these bottles on the "L." It was a beautiful, clear winter day. As we were nearing the theatre, I looked in my purse for money to pay for the fare. Just as I was doing this, I felt the taxi quickly speed up into a left hand turn by the huge bronze horses at the entrance to Grant Park just past the intersection of the Congress Expressway and Michigan Avenue. I looked up to see a car a split-second away from

hitting the taxi exactly where I was sitting. I flew across the car into opposite car door. Soda sprayed everywhere on the impact. The lesson I had learned at my Tai Chi class that morning was to move in circles. This lesson probably saved my life. Had I not thought to move in circles, I would have likely gone through the left rear car door window. I sheltered my head from the impact with my arms and hit the door handle before I fell onto the edge of the car seat in a line from just behind my left ear to my right hip. Somehow I had the presence of mind to note the plate number of the car that hit the taxi and subsequently took off: Illinois 862 309, a grey four-door sedan with significant right front bumper damage. I wrote it all down in a small notebook I kept with me all the time. Dizzy and disoriented, to no avail, I tried to call my supervisor and the business agent for the wardrobe local. I stumbled across Michigan Avenue to the stage door of the Auditorium Theatre, found my supervisor and, with her, returned to the disabled taxi. We took pictures of the taxi, got the driver's name and medallion number and insurance information.

Because the holiday season is loaded with shows throughout the city, I knew there was no one to take my place that day. Somehow I managed to struggle through the matinee. I now know that I was in shock. After the evening show, I went to the emergency room. There, I was given prescriptions for pain, inflammation, and told see my regular doctor as soon as possible.

The following morning, I signed the papers to close the sale of my house lying on the examination table at a doctor's office. Thus began the biggest DIY project in creativity I have ever undertaken. Rebuilding a life after a Traumatic Brain Injury is one of the most thoroughly creative things anyone will ever be called upon to do. Simple

things like walking a straight line and focusing on any task at hand did not come easy. I have often likened the experience to sorting through a basket of socks fresh from the laundry. Trying to find and pair up endless pairs of socks that are only slightly different, you know there are matching pairs of socks. Somehow they all look the same. Somehow they all look different. The task seems endless and confusing on several levels.

As I lay recovering from my injuries on my sofa in the house that I had just sold and subsequently leased from the new owners who graciously understood my dilemma, I saw many veterans from the U.S. armed forces returning from service in Afghanistan and Iraq on television complaining about undiagnosed maladies extremely similar to what I was going through. These veterans and I were all plagued with the same dizziness, relentless headaches, sensory motor problems with walking and carrying on normal everyday activities, rage and emotional instability, memory loss, and cognitive difficulties. Because of my premiere health insurance provided me through my employment with the International Association of Theatrical and Stage Employees (IATSE), I was afforded much better care and more significant resources than were most of these veterans. The Veterans Administration had never seen so many returning veterans afflicted with Traumatic Brain Injuries (TBI). The widespread use of Improvised Explosive Devices (IED's) gave rise to the signature, often invisible, wounds of these wars. These veterans and I were all in the same boat. This was my tribe.

I sought out several of these veterans to share with them what I was doing in physical therapy and other things I had researched and implemented into my own care. What I learned early on in my recovery process was that this was going to be a largely DIY process. Most doctors I saw, even well known neurologists, therapists and

researcher scientists, knew very much about the everyday problems that faced TBI patients. Having a traumatic brain injury is not necessarily the kind of thing that promotes social interaction. Feeling slow and very much not the person you were pre-injury, does not promote confidence on any level. Brain and mental health issues are very much kept on the under wraps in the military. In both military and civilian life, there is significant stigma associated with seeking out mental health issues. Even in civilian life, I felt a huge difference in the way people treated me when they knew I had a TBI. Healing and returning to one's life seems a lonely road to travel back to an active life. It need not be that way. Adopting a creative approach and "using" one's new normal rather than "sitting back and "getting used to your new normal" can make all the difference between a life of learned helplessness and a hopeful, productive new normal life.

Again and again, during my own recovery and in workshops and presentations for this project, I have heard from TBI veterans and civilian survivors that they do not like rehabilitation. They do not like being treated as patients. The tone of voice of therapists, the prescribed treatments and therapies that may or may not fit their individual situation, the constant reminder of their obvious mental deficits all make for an environment that gets old and repetitive in a relatively short period of time. By no means, is this CPS program intended to devalue the treatments or provide a substitute for therapies necessary in early stages of TBI recovery. This toolkit is designed to be an auxiliary DIY program that can be easily, individually accessed with on-line and personal support. What my CPS/TBI toolkit will provide is training to better live with a TBI and to redefine and use the survivor's "new normal" rather than to focus on "getting used to one's new normal."

Employing the principles of creative problem solving can provide a structure, a framework, for making what seems to have slipped away familiar again. Employing the four phases of CPS can lessen the overwhelming sensation that problem solving often brings to the TBI survivor. Learning the basic format of the CPS framework and applying it to sensory motor, attention and focus, emotional inhibition, and memory issues can help to restore meaning to post-TBI life.

Section 2: The Literature

If we hope to see things more clearly as they actually are and thereby perceive their intrinsic wholeness and interconnectedness, we have to be mindful of the ruts our thinking gets us into, and we have to learn to see and approach things differently.

Kabat-Zinn (1990 ,p.157)

Indeed, everyday creativity is about everyone, throughout our lives; it is fundamental to our survival. It is how we find a lost child, get enough to eat, and make our way in a new place and culture. It is not so much what we do as how we do it, whether this is at work or leisure. With our everyday creativity, we adapt flexibly, we improvise, and we try different options...

Ruth Richards (2007, p. 25-6)

Taking my cue from these two great writers and researchers, and *Applied Imagination* (Osborn, 1953), Sid Parnes' challenge to expand the reach of creativity, along with Win Wenger's infinite inspiration, with this work, I am introducing creative

problem solving to Traumatic Brain Injury re-training (Fraley, 2008; W. Wenger, June 20, 2014). Creative Problem Solving is not only the provenance of business and organizational professionals and educators. There is so much more we can do with our inherent creativity. It is a central force of our human nature. We all can live creative lives. As human beings, we all need to live creative lives, especially those for whom the world makes little sense. The principles of CPS can provide an easily accessible, welcoming framework for mTBI survivors to work through the myriad of challenges that face them each and every day. It is also my hope, that with the assistance of neuroscience researchers that this toolkit can someday be used to assist research exploring the creation and re-establishment of neural pathways and networks.

With the interest in sports-related concussion, the interest on the part of the V.A. to improve the mental health of soldiers and returning veterans, and Human Connectome Project, the mandate to map the brain over the next five years as set forth by the Obama administration there is a plethora of literature recently published about the causes, symptoms, and remedies for Traumatic Brain Injury. These days it seems that hardly a day goes by without a news story of someone, either in military or civilian life, whose deteriorating mental status has gone tragically wrong ending in some violent action affecting us all in some way or other. I would venture to assume that many of these tragedies are the result of an undiagnosed or untreated traumatic brain injury.

There is hardly a bleaker, less creative place or experience that a person can inhabit than the seemingly endless, murky, foggy days following a traumatic brain injury. The familiar seems oddly unfamiliar. Wakefulness seems somewhat like sleep. There is little automatic in any reaction. Nothing makes sense the way it once did. A deep longing

to just get back to the way things were sets in along with a sense of helplessness and little hope.

Since 2007 when I was hurt and some of the first diagnosed TBI veterans were returning from the Middle East (Martin, et al, 2008), there is been no new shortage of brain training regimens, some founded firmly in scientific principle, some pure snake oil, and many somewhere in between. The most notable among these is Strategic Memory Advanced Reasoning Training (SMART Training) developed by Sandra Chapman and her associates at the Center for Brain Health at the University of Texas-Dallas. This program is hierarchically based on a series of ever-increasingly involved attention strategies blocking less relevant details to focus of more pertinent information needed to the tasks of everyday life. SMART Training has garnered a great deal of attention from the Veterans Administration (Fager, 2014) and is currently in use with many veterans' TBI and PTSD recovery programs (Vas, Chapman, Cook, Elliott, & Keebler, 2011).

In many current TBI rehabilitation settings, the emphasis is placed on “getting used to your new normal.” While it is true that things will never be the same for the TBI survivor, recovery need not be a passive activity focusing of deficit and delay, “getting used to your new normal.” I would suggest shifting this paradigm towards “using your new normal” to create a new post-TBI life. The sense of loss that accompanies TBI presents a tremendous challenge. The desire to just get back to what was often is the first focus for many TBI survivors. Accepting the current moment and moving on from this moment is not an easy task for any of us. Here I subscribe to much the same approach adopted in SMART Training, in that they present their program in terms of retraining

rather than rehabilitation. Working as a nursing assistant in the Pediatric Developmental Disabilities Department at the University of Iowa Hospitals, my best memories of the children who were out patients were when we treated them like normal kids. They responded like normal kids. They thrived.

Presenting a respectful, hopeful series of possibilities is key to my view of any creativity training and re-training. In every challenging situation, whether it be in business, in personal life, in brain re-training, a willingness to start where you are rather is crucial. One must put aside expectations and presuppositions of others. Only you know where you truly are. There you can begin.

Beginning where you are also prominently figures into Mindful Meditation techniques. Throughout my personal recovery, I practiced Mindful Meditation as I had for many years before. On a personal level, I found this practice to open my mind to more clearly embrace the day-to-day work of my recovery. Similar empirical results were found in studies on immune response (Davidson, et al., 2003), a study on depression and TBI (Fann, Hart, & Schomer, 2009) and another on long-term fatigue associated with TBI (Johansson, Bjuhr, & Rönnbäck, 2012). Focusing on one's breath centers the mind. Especially in the injured brain, this process is a valuable starting point (Lutz, Johnson, & Davidson 2008), (Lutz, Slagter, & Davidson, 2008). Mindful Meditation has been shown to have many positive effects in numerous aspects of everyday health and living (Miller, Fletcher, & Kabat-Zinn, 1995; Davidson, et al, 2003; Vestergaard-Poulson, et al., 2009). It is my contention that Mindful Meditation has much to add to the CPS process as a whole in that its effects tend to slow judgment and increase cognitive flexibility (Moore & Malinoski, 2009). Coping with the changes and uncertainty that trauma brings is part

and parcel of Mindfulness Based Stress Reduction (MSBR) (Grossman, et al., 2004). Eric Garland has taken a somewhat different approach with his Mindfulness-Oriented Recovery Enhancement (MORE), which concentrates more on mindfully shifting attention in response to pain and stress (Garland & Howard, 2013). All of this figures into creativity in that it mindfulness and meditation shift brain activity from the frontal lobe where judgment, decision-making and executive function processes take place. By extension, this provides a neurological basis and method for the CPS principle of refraining from judgment.

Tai Chi figures prominently into my practice and TBI recovery. My practice, in effect, saved my life. Long-term tai chi practice has also been associated with lower brain stem and left forebrain structural differences in TBI individuals (Gemmel & Leathem, 2006). Keeping brain activity in the cerebrum and decreasing activity in the frontal lobe and brain stem can increase free-flowing thought and limit judgment and suppress instinctual behavior thereby increasing creative responses to adversity. The Buddhist adage, “Pain is inevitable; suffering is optional” is the beginning of the paradigm shift embodied in this toolkit.

Masquerading the symptoms of traumatic brain injury visible to others is common among survivors. I call this “pack-dog adaptability”, manipulating, adapting and masking one’s weaknesses to insure one’s standing in the group or pack (Creel & Creel, 2002; van Kerkhove, 2004), if you will, to fit in and not be excluded from everyday social activity. Pack-dog adaptability is not only the provenance of TBI survivors It is all too common for all of us to hide the “chinks in our cognitive armor” to insure that we are heard, that our contributions to the group, to society as a whole, are not overlooked and

dismissed. Especially in post-TBI life, there is a common tendency to regress toward personally protective behavior. Having a traumatic brain injury is not necessarily the kind of thing that promotes social interaction. Feeling slow and very much not the person you were pre-injury, does not promote confidence on any level. A large part of this involves hiding what is most hurtful, what most desperately needs to be healed so as to attempt to “fit in” with the rest of our pack, our family, friends and caretakers. Here is where creativity can come into play. Gathering information without judgment can provide a divergent point of view for a TBI survivor facing any problem. When one views the unfamiliar as threatening, one regresses whether one has a brain injury or not. Without jumping forward and engaging judgment, TBI survivors can circumvent the feeling of becoming overwhelmed by enumerating and assessing the elements of a problem at hand.

The deliberate principles of Creative Problem Solving working through each stage of any challenge using divergent and convergent thinking (Osborn, 1953), play exquisitely into creating a framework for re-establishing and re-building a new normal life. Changing the focus from “getting used to” what one is left with after TBI to “using” one’s new normal state to build the life one wants invites the TBI survivor to take an active role in recovery. This is a departure from returning to the life one had before injury. That life is gone. Moving forward in incremental steps building on the life one has each and every day is a more empowering stance and assures a more complete recovery.

Moving away from a sense of learned helplessness can be a game-changer. Ellen Langer’s work with elderly men who were thought to be frail and helpless gives credence to my efforts with TBI survivors. When the men in Langer’s ‘counterclockwise’ study

were in a nursing home, they relied heavily on caregivers and staff. During the 1950's-based retreat held by Langer and her students, they were much more active and ended their week playing touch football (Langer, 2009).

The very language of Creative Problem Solving provides a sense of hope, possibility, and strength. Using questions to frame challenges invites dialogue and opens the possibility of discussion and engaging input without judgment from a variety of sources. The atmosphere of medical and therapeutic care associated with TBI patients often subordinates the patient and reduces them to terms of compliance with the authority asserted by doctors, therapists and other caregivers.

Repeating the word "*might*" in the formation of questions within the CPS process reinforces, if only subliminally, a sense of personal power. Introducing "*might*" into the vocabulary of any TBI survivor instills a sense of strength that has all but disappeared with injury. The change of attitude this small shift in phrasing a question can enlighten the injured mind and shift the paradigm from prescription and compliance to active participation and self-determination of one's fate. Gone is the sense asking for permission associated with using the word "can". *Might* changes all that and opens a world of possibility. Strength and self-determination bring with them a sense of hope that is all too often missing from post-TBI life, which can be a static world without change. Hope can restore the change that ordinarily fills our everyday lives. Hope. Possibility. *Might*. Those words provide the verbal cornerstones of my toolkit. These three words are the cornerstones of any change, personal or professional.

Section 3: Project Plan

Introduction

Early on in the development of this project, it became obvious that the scope of the entire project would stretch well beyond the confines of a single semester. In effect, the work of this project has stretched over two years. For the purposes of this paper, I have concentrated on the development and testing of only the first eight tools. Currently these tools exist only as prototypes and produced in limited quantities for individual workshops. In the individual workshops, each of which lasted slightly more than one hour, only four or five tools were introduced per session. With this in mind, I realize the true scope of refining these tools for publication and release on Veterans Day 2015.

Project Timeline

Table 4.

Master's Project Plan and Timeline

Date	Task Description	Hours (Estimated/ Actual)	Status
08/2014	Tool Writing and descriptions	30/45	10 tools completed
8-9/ 2014	Preliminary tool trial run workshops	15/20	Completed

9/15/2014	Preliminary project concept paper	6/12	
10/10/2014	Revised tool workshops	15/15	Completed
10/10-12-10/2014	Guidebook development	25	Incomplete Preliminary tool guides are included in 'The Tools' section of this paper.
10/10-12/10/2014	Website development	15	Incomplete To be continued
10/31/2014	Preliminary Project conference with Mike Fox	1/ 2.5	Completed
11/03-11/20/2014	Final revision of Project	15/30	
11/20/2014	Presentation and submission of Project		
11/20/2014-			
11/15/2015	Continued work on tools, support materials		Ongoing

3/25/2014 Meditation/creativity retreat center construction begins

11/11/2015 Roll-out of the completed CPS TBI Toolkit

Future Projects

On 30 acres I inherited from my parents, currently in pasture in Iowa, I am building a meditation/creativity center, the plans for which are still in the early stages of planning. During the summer of 2015, the barn, which will become the meeting building of the center, will be restored, if possible, or torn down and reconstructed into a new large meeting building. Housing for guests will be a combination of restored Airstream trailers and tiny house built on small cargo trailers. This center will provide a quiet place to hold workshops and retreats in a place where there are no artificial lights at night from other surrounding properties. This property has been in my family since the 1965 and overlooks the property where my great-grandparents first homesteaded after their arrival in the United States from Germany.

In developing this property, one of my guiding principles is based on Kintsugi, the Japanese method of saving ceramics using gold with laquer. Kintsugi does not disguise the cracks but highlights them in shimmering gild. The reformed ceramic works represent a beauty acquired through overcoming suffering. As much as possible, I want to re-use the materials left there by the Eckelberg family and my own family mending them together to honor the work and efforts of all who have been here before me.

Testing and Revision of the Tool Kit

For the purpose of this project, only the first eight of a planned 40-card deck were explored. I had mixed emotions about using only 20% of the complete deck in this project. In practice, because of time limitations, these eight tools were more than enough. Ideally, testing would have begun with a completed set of tool cards. This will happen in further trials for this tool kit. For the purpose of the initial introduction of this toolkit to TBI support groups, the length of time to present even eight tools significantly stretched the attention limit of these participants.

With these eight tools in hand, a series of ten workshops were held over the summer and the fall of this year to introduce these tools and the Creative Problem Solving Process. Of the ten separate workshops which were with held, six were with veterans TBI support groups and four were with a groups of civilians, whose injuries were sustained from a variety of incidents, falls, automobile accidents, and sports injuries, as well as IED injuries sustained in combat. Some participants had more than one TBI. Some had other injuries that affected their TBI recovery. The range of time from their initial injuries ranged from 6 weeks to 10 years.

Appendix 2 illustrates the handouts given to each of the participants. Attendance at these workshops was limited to 8 participants. In the veterans groups, three participants attended at least two workshops. Generally, to keep these workshops to 90 minutes, I was able to introduce four or five tools per session. Each of the eight tools had at least three introductions. In the end, all of the participants took their materials with them.

I was amazed at the reception the tools received at each workshop. Overall there was an overwhelming sense of gratitude expressed after each session. These brave TBI survivors were exceptionally grateful at the very thought that someone would devise these tools specifically designed for TBI survivors. Every single session ended with many, many hugs of thanks for my work. Every single participant took his (her) kit with him (her). Several have emailed me with suggestions for improving the tools and with suggestions for additional tools to work on their particular challenges. Several have either phoned me to clarify how these tools can be used. I tend to think that much of this response was due to the fact that I am also a TBI survivor, that they can imitate and empathize with me more so than with therapists and other professionals with whom they come in contact. My interest was piqued by this response and research in the area of empathy and imitation (Carr, et al., 2003; Leslie, Johnson-Frey, & Grafton, 2004; Iacoboni, 2009; Bartal, Decety, & Mason 2011; Mason & Bartal, 2010). While I did not explore empathy as a part of this tool kit, the subject begs for further research in how empathy shapes the injured brain and its recovery.

I began each session randomly pairing up participants and asking them to introduce themselves to each other by telling each other something about themselves, about their injury, about how they had been coping with the aftermath. After about 5 minutes, I asked one partner from each pair to introduce the other, then the one introduced did the same for the first.

What seems to have happened more often than not is that the introducing partner relates something similar to their plight when introducing their partner. This got very emotional from time to time. When people realized that they were not alone in going

through this post-TBI life, they tended to open up to each other and instinctually help each other. I am currently working on this introduction technique as a tool in and of itself. Again, the role of empathy deeply affected the experience of these workshops.

After introductions, I went over the contents of their handouts and gave a general them a general overview of CPS, explaining divergent and convergent thinking and how CPS is a framework for problem solving. What they responded to the most is the idea that you can start anywhere in the process after you have determined where your problem falls into the various stages of CPS.

The next step was to present the tools and situations in which to use them. In most workshops, we got through 4 or 5 tools in an hour to 90 minutes after which I asked for questions and suggestions about what they needed to use these tools in their everyday lives. Here again, almost every participant expressed immense gratitude for my efforts. I know all too well, from personal experience, how lonely the path to recovery from TBI can be. Finding another traveler on a lonely road is often comforting. I often wonder how I would have reacted had I found such a workshop in the dark days after I was hurt.

I did not keep statistical data on these workshops. Even though I began this project as a research project, that goal soon fell by the wayside as the workshops began. Early on it became much more important to focus on the welfare of the participants and the validity of the tools in terms of how they could be used. The sample of TBI survivors represented in each group was inconsistent. Some participants were relatively early in their recovery. Others had struggled for years with the effects of the injuries. The scope of the actual injuries varied widely from falls to domestic violence to moving vehicle accidents to sports injuries. Even with the veteran groups, the extent of their injuries

varied in many significant ways. Some had repeated injuries. Some had PTSD. Some had other injuries that affected their cognitive processes and communication skills.

In the end, over the course of these 10 workshops, I can anecdotally report that the reception for this abbreviated version of the toolkit was more than I could have expected.

Section 4: Products and Outcomes.

The complete goal of this project is threefold. While there are numerous sources for advice and rehabilitation for TBI survivors, none of them truly focus on the positive aspects of pursuing recovery in terms of training incorporating creative problem solving techniques. These strategies will be based on the original Osborn/Parnes model (Osborn, 1953) focusing on divergent and convergent thinking.

1) The toolkit

This toolkit consists of a deck of 40 tool cards, 4 suites of 10, each focused on one of the specific major problems associated with mild traumatic brain injury.

- A) Sensory motor problems
- B) Cognition and learning
- C) Emotional inhibition and behavior control
- D) Memory

What does a DIY CPS TBI Toolkit look like?

With the social stigma attached to brain re-training and recovery and the highly individual path that each recovery takes, it is important that this tool kit can be discreetly,

individually used on a long-term basis as necessary. Portability also factors into the value of these tools. Problem solving happens everywhere we travel through this life. With the short-term memory challenges associated with TBI, portability is crucial. Keeping these things in mind and recalling the many hours I have spent playing cards with veterans in VA Hospitals across the country, developing this tool kit as a deck of cards serves a multitude of purposes. Individual tool cards can be used and arranged according to frequency of use and co-use of tools. A deck of cards is relatively inconspicuous and very portable.

In honor of the many veterans who are such an inspiration to me, the backsides of these cards will be illustrated with a variation on Army-issue desert camouflage. Each challenge, focus and attention, sensory motor, memory, and emotion inhibition will be represented in a separate color-coded suite much like a standard deck of playing cards.

This toolkit is based on the principles of Creative Problem Solving (Osborn, 1953) incorporating kinesthetic learning outlined in Griesbach's research on exercise and TBI (Griesbach et al., 2004; Griesbach, et al., 2006; Griesbach, et al., 2009), Dave Meier's work (Meier, 2000) and mindful meditation techniques (Kabat-Zinn, 1990) and slogan learning. Because of limited attention challenges faced by most TBI survivors, the tools are kept simple and short, making them easily used without excessive time requirements. The tools address the four major challenges that face TBI survivors: memory, emotion inhibition and behavior control, sensory-motor issues, and attention and concentration. These tools are designed to address the challenges of mild TBI (mTBI) survivors and those who have experienced closed head trauma post concussion syndrome (PCS). The symptoms of PCS can last for weeks and months. There is no

treatment per se for PCS. This toolkit is designed an auxiliary training program to supplement prescribed treatments and to assist TBI survivors in independently developing their skill sets toward living more fulfilling lives. Although this toolkit is designed to address the issues acing mTBI survivors, the use of the kit is welcome to all TBI survivors.

This toolkit represents the first step in a multi-faceted project. An interactive website to support the use of these tools is currently in the works. Workshops with the completed set of tools will be made available separately to therapists and survivors. The official roll-out of the completed tool-kit and website is currently scheduled for Veterans Day, November 11, 2015 at the National Veterans Art Museum in Chicago.

THE TOOLS

These eight tools represent a sample of the 40-card deck of tool cards based on the principle of creative problem solving designed to enhance four major areas of challenged presented by mTBI survivors. As much as possible, the titles of these tools incorporate slogan learning to reinforce memory and mindfulness. The difficulties presented by these survivors are exacerbated by protective behavior by neurological brain changes.

Drop Back 5, Give me 5

The idea for this tool came out of a couple of different ideas. First I was struck with the tremendous suicide rate among returning veterans. Secondly, I wanted to

develop tools within the vernacular of the armed forces. “Drop and give me 20,” is a familiar command given by a superior officer ordering a soldier to do 20 push-ups as a disciplinary punishment. “Drop back 10 and punt” is a metaphor from football used when the team's running options are all used up, the only safe option left is to drop back a bit and punt the ball as far as possible into the opponent's zone. “Give me five” is a greeting or show of joy and affirmation in the public vernacular.

Impulse control is a common issue with TBI survivors. Training has been shown to be effective in this area (Denson, et al. 2011a, 2011b). Not only is impulsive behavior potentially harmful to the TBI survivor, violence and suicide are both all too common among TBI survivors.

Combining the expectations of all these phrases, *Drop Back 5, Give Me 5* is a tool useable in many situations to inhibit instinctual, automatic, emotional response. It can be used in either individual or group situations. When a person has shut down their options and is acting on impulse, DB5,GM5 can be stated aloud or to one's self allowing one to pause, physically step back 5 steps and re-approach the challenge with five new ideas, one with each returning step. In effect, this tool enforces self-discipline and helps one step back and reassess the situation while allowing time to develop at least five new solutions.

While this tool was developed for impulse control in desperate situations, the applications for use elsewhere are easy to adapt. Currently, this tool used in a group home for mentally challenged young adults and by several TBI support groups. I have also presented this to a group of LGBT teenagers as a strategic tool in dealing with bullying. Business applications are also possible.

In terms of CPS, this tool engages the affective skill of avoiding premature closure (Puccio, et al., 2011, pp. 73) and E. P. Torrance's creativity skills, *The Problem* (Torrance, 1979, p. 13), *Produce and Consider Many Alternatives* (Torrance, 1979, p. 32), and *Keep Open* (Torrance, 1979, p. 86).

Plus 1, Minus 1

The purpose of this tool was to develop an easy first step toward looking at the challenge at hand. TBI survivors are easily overwhelmed. The desire to recover and to fit in again often exacerbates this feeling and brings a great sense of frustration. By looking at a situation or challenge and considering only one this to either add or subtract from the situation stimulates a more lengthy exploration of possibilities.

This tool can be used individually as a pen-and-paper exercise or in groups as a Post-It presentation. A challenge is listed and elaborated in terms of its individual aspects. Then a list of potential things that might improve the original challenge are listed. One is selected and added to the original challenge. Convergent thinking is used to determine if this improves the original situation. If it does it stays; if not it goes away. Much the same process is used in the *Minus 1* process. The individual aspects of the original challenge are re-listed and examined one at a time to determine if leaving them behind would improve the situation. If removing something proves beneficial, that aspect is removed.

This is basically a simplification of the basic Clarification phase of CPS. Here again, this tool employs Torrance's creativity skill, *Combine and Synthesize* (Torrance,

1979, p. 116). By limiting the focus to the challenge at hand, this tool also can help to increase focus.

Break It Down, Build It Up

Setting priorities after TBI presents many challenges. Everything can seem confusing and extremely urgent in light of slower processing and response time. Very little makes sense the way it did before injury. What one wants to do seems as urgent as what one needs to do. Examining the possibilities of what to do at the immediate moment in terms of what one needs to do and what one wants to do gives pause to impulsive behavior and choices that can have unintended consequences. Considering individual choices that contribute to an overall solution in terms of need and desire can also set preliminary priorities. Creating these lists, separating what one needs to do and what one wants to do, can make it much easier to set priorities and to start to recreate routines and rituals.

This tool can be used by individuals and in groups. This tool is presents a simplified version of the clarification phase of the CPS process.

Ruts, Rituals Repetition

This tool addresses mindless automatic behavior, which can evolve with TBI survivors in the quest to speed up their apparent recovery and appear more like their previous selves without addressing the changes that come with TBI. We all fall into mindless habits that do not serve our ever-changing lives. For all intents and purposed, this tool can be used by any of us who have fallen into this trap.

To use this tool, one habit, most likely one that does not promote healing or forward motion, is selected. Then we are asked to do this same thing in a new way. An important aspect of this tool is incremental change. We are not asked to leave anything behind. We are asked to put a new spin on what has become automatic. This basic idea for this tool is reinforced by Amabile's idea of 'playing with ideas' (Amabile, 1989, p. 49), her idea of 'breaking out of scripts', (Amabile, 1989, p. 49), and Ellen Langer's notion of mindfulness (Langer, 1989).

This tool can be used by individuals and groups.

Write, Rinse, Repeat

The idea of repetition, of deliberate practice, is central to this tool set. Deliberate practice is essential for memory formation. *Write, rinse, repeat* was initially inspired by a well-imprinted phrase from advertising. Memory issues plague nearly all TBI survivors. This tool is designed to incorporate kinesthetic learning to make new somewhat subliminal emotional connections with new memory creation.

The instructions for this tool are fairly easy. The only equipment necessary is a stack of post-its, index cards or paper. One writes something he/she wants to remember. That paper is turned face down. The user walks away, taking in the experience of the world immediately around them. Returning to the paper, he/she says aloud what they wrote on the paper before turning it over. When the paper is turned over, they recite what is written. Cues for remembering what is written on the card can be associated with any sort of sensory experience. The point is to create a sensory experience of what one needs to remember to solidify that memory in emotional, experiential terms.

Increasing what is to be remembered and the length of time and distance increases mindfulness and stimulates memory in developing connections between what is written and what is around the used. Again, this tool employs Amabile's notion of 'playing with ideas' (Amabile, 1989). My personal experience in Dave Meier's *Accelerated Learning* (2001) training also plays into the development of this tool. Incorporating physicality into brain training reinforces this idea and engages senses in learning.

Begin Where You Are, Go Where You Know

Losing words from one's vocabulary often accompanies TBI. Finding the words you know can be a frustrating experience that makes communication difficult for everyone involved. By refraining from judgment about what one starts to say and what one means to say, new memories and associations can be made by charting what one has in mind at the moment and free-associating other words that may come to mind on the way to arriving at what one meant to say in the first place. Charting this tool in a nautilus shape makes it more of a game than a tool. This increases creativity by infusing a sense of playfulness (Puccio, et al., 2011).

This tool can be used individually or with a caretaker or partner. Begin by writing with the word one first thinks of in response to a question or task and then writing the subsequent words that come to mind on the way to finding the word one first wanted to say, associations and memories are made. Reviewing and repeating these series of words may stimulate new neural pathways and increase memory capacity. This, like all the tools in this toolkit, begs for research including neuroimaging to more clearly show the efficacy of this tool.

A Single Petal Does Not A Flower Make

This tool is a simplified variation on other tools of creative problem solving including the fishbone diagram, where individual elements and tasks leading up to a central goal. Using a lotus flower as the base of this tool is in keeping with images associated with mindful meditation. The diagram can be expanded with additional petals or the use of other more detailed lotus drawings. My thoughts about using the simpler lotus were focused, as in other tools, on keeping this toolkit as simple as possible and not overwhelming the user with too much detail.

This tool is used to develop a process, to detail strategies, to uncover bottlenecks in thinking, to identify where a process is not working and how to work through those pesky bottlenecks.

Plank Reading

This tool incorporates all the cognitive activity that is involved with reading with the kinesthetic learning aspects of planking. Depending on the strength of the participant, planking can be done from either the knees or the feet. Beginning plank reading should begin with reading material that is simple and engaging to the participant.

Starting with a 15-second timed interval, the participant assumes a plank position and reads aloud a selection related to the challenge at hand. This can be a slogan, a favorite quote, a prayer, anything fairly short in the beginning practice of this tool. With practice, both the length of time spent ‘planking’ and the complexity of reading material

can be increased to stimulate the participant's mind and body and to decrease boredom with the tool.

This tool activates other neural networks that activate more muscle activity while developing focus.

2) The Support Resources

A) Participant Website – a resource to support and explain the individual tools and to provide a discussion forum for users of these tools.

B) Guide book to accompany the toolkit – a tangible resource for both participants and practitioners easily portable and not reliant on technology for those more tactile inclined.

C) You tube videos- to support visual learners.

D) Website for therapists and other practitioners to use teach the tools and to set up workshops.

D) Review trials with the tools and physician input – to insure reliability and use of tools.

E) Continued trial workshops with veterans' support groups and TBI support groups.

3) The Meditation and Creativity Center in Jackson County, Iowa

A) To create and share a quiet place to think, contemplate and make things to make for a more creative life.

- B) To build my own legacy that honors my father, a Korean Conflict veteran; my mother, a longtime teacher; Martha Raye, a tireless entertainer of civilians and veterans alike, a 2-time Purple Heart Medal awardee; and my cousin, Ronald Beeck, another Purple Heart Medal awardee, and a casualty of the Vietnam war.

THE RESULTS OF THE PROJECT

PPCO Analysis of the Workshops

Pluses:

- The workshops were very well received.
- The tools were not too complex so as to be immediately useable.
- Emotional connections between learning new cognitive skills and how the participants envisioned their restoration and rehabilitation were made.
- Participants made new connections among themselves or further contact and use of the tools.
- I felt confident in presenting these tools knowing that, even in their primitive stage, they are useful to my fellow TBI survivors and represent a new approach to DIY-TBI recovery.

Potentials:

- Use of these tools might provide the basis for further cognitive/ brain imaging research.
- Use of these tools might be a part of a much larger program for TBI survivors.
- Use of these tools might help many veterans who sometimes feel forgotten.
- Use of these tools might increase empathy among TBI survivors.

Concerns:

- How to insure that these tools are valid and reliable.
- How to insure that my results with these tools are replicable.
- How to determine the role of empathy in the efficacy of these tools.
- How to design research to further test these tools.

Overcoming Concerns:

- Developing research proposal with a neuro-imaging researcher.
- Further work with Veterans' Administration contacts
- Further workshops and program development with TBI Support Groups

Observations

All of these eight tools were introduced and tested in at least two separate workshops. Of all the tools, “Drop Back 5, Give Me 5” was far and away the most effective and most readily adopted. It’s catchy. Because of its applications in situations including conflict resolution and convergent re-evaluation and re-examination of aspects of the challenge at hand, it became the slogan of many workshops.

In more thoroughly evaluating these tools, a much more lengthy trial with many more participants is needed. I regard creativity as a practice, not as a relentless chase after a ‘Eureka’ moment, so I envision longitudinal trials with participants with various injuries and various length of time since their individual incidents. The value of these tools needs to be studied over time to see if their use can enhance changes in brain architecture to determine their value on that level. The anecdotal evidence I have garnered is just that a small series of workshops to introduce these tools, an incomplete

toolkit at best, gives little indication of the efficacy. To look at the practice of these tools in a longitudinal study including brain imaging could potentially bring to light a view of the creative process in terms of brain plasticity and neurological change.

Whether the participants were reacting to my story, our shared story, and my enthusiasm for this toolkit and this new chapter in my life, has yet to be determined. After the ten workshops introducing these tools, it became apparent that much work remains to more effectively evaluate these tools. I did not set up these workshops with statistical evaluation of the tools in mind. While the initial response was very positive to most of the tools, the real effectiveness of the tools was blurred by the tendency of the participants to be emotional, overwhelmed, and extraordinarily grateful for the development of these tools by a fellow mTBI survivor. My extensive reading on imitation and empathy made me think that a good deal of the participants' response was enhanced by their empathy for me and their subsequent desire to please me and, therefore, to put forth their best efforts. Over and over, I saw a light in their eyes when they 'got' the gist of a tool. This truly ignited their desire to learn and work, to re-learn and re-work, with the other tools. This part of the process, this small early success with CPS, is important to any facilitation in business, education or personal life. The introduction of the CPS process and a framework for problem-solving it employs gave these mTBI survivors a light in the muddled daze of their everyday lives.

After studying research design in the School of Public Health at the University of Illinois-Chicago, I realize the importance of sampling in testing the effects of any product. The vast array of injury and complications associated with traumatic brain

injury made it obvious to see that a much larger initial sample based on duration from injury, extent of injury, comorbidities, and age among other factors. Because of the wide variety of injuries incurred among the nearly 80 participants in these workshops, any kind of meaningful sample for research purposes was impossible. What I did find was that despite the wide variation in injury, every single participant found something that worked for them in this tool kit. Some people were initially frustrated with the exploration a new way of thinking. Most were willing to give it a go. All were deeply appreciative that someone else who had also suffered a TBI was willing to take the time to put this tool kit together for them.

Who can say if I've been
Changed for the better?
I do believe I have been
Changed for the better
(Elphaba)
And because I knew you...
(Glinda)
Because I knew you...
(Both)
Because I knew you...
I have been changed for good...

-Stephen Schwartz, 2003

Section 5: Lessons Learned, Lessons to be Learned

If we knew what it was we were doing, it would not be called research, would it?

-Albert Einstein

My love of research was ignited early in my career when I worked as a food technician on early at the University of Iowa Clinical Research Center with Dr. William Connor (Raymond, et al., 1977). I immediately fell in love with scientific technique and the precision with which these studies were done. When I saw the results of these studies in the popular press, I felt that I had been a part of something that could directly affect people's lives. There have been times in working on this project when I have felt I was approaching that same feeling.

The overwhelming response to my embarking on this project has buoyed me through my darkest hours. After my lengthy career in wardrobe in theatre, film, and commercial photography, many people found it a deep stretch for me to study creativity at all. Many found it an even deeper stretch to concentrate my graduate work on traumatic brain injury rehabilitation and retraining. For me, it seemed a logical progression.

After my injury, I had used the routine of working as a swing (substitute) dresser on *Wicked* to relearn many, many things, i.e. tying shoes, relearning sequences, delaying reactions. The comfort of the routine and the variety of the twelve different dressing tracks that I covered as a swing dresser laid the foundation for my DIY-TBI recovery. As I later traveled across the country with the show, visiting VA hospitals along the way, I found a great affinity with the veterans I met. This volunteer work took on a great deal of personal meaning for me. Every time I saw a fellow TBI survivor's eyes light up when they figured out the sequence of a card game or learned a new tool in a workshop, I knew I was on the right track. If I could make the journey back to an easier, more meaningful

life for just one of my fellow TBI survivors, I knew I could rest easy knowing I was putting my late-blooming graduate school education to good use.

My first thoughts about this project, that cold November day two years ago when I talked with Dr. Cabra were of pursuing research. While I have had a lengthy artistically creative career, in my heart, I was in seventh heaven in CRS 580 Creativity Assessment: Methods and Resources. I loved reading research studies. I loved deciphering the various research methods. I loved examining if the results of this research were as valid as set forth. I loved and still do love research. In many ways I see science, in particular, research, and artistic endeavor as much the same process. Research serves to unveil the essential nature of life by astute observation. The work of an artist is the distillation of observing a single moment in time and distilling it into a stylized piece of artwork to reflect the essence of that moment in the eye or ear of the beholder. To me, the medium may be different but the process is the same. Both science and art are grounded in the human condition. Observations whether at the end of a paintbrush, with a finger on a piano, with eyes peeled on a collection of data or with hands on the shoulder placed there to reassure a patient, all this work is creative.

Moving forward it is important to me to develop this toolkit with rigorous empirical integrity. Today with the ever-growing popularity of everything having to do with neuroscience, there are a great number of brain training programs, games and toys with little scientific integrity. The marketplace is filled with products and processes preceded with the prefix *neuro* in everything from marketing strategies to vitamin supplements. My hope is to pursue my work with a neuroimaging researcher to continue to examine how cognitive tools can impact the injured brain. I have never felt that the

traditional assessment measures of creativity were a good fit for determining the validity of this toolkit. I have always seen this project being evaluated in terms of neuroimaging.

Some research on lesion studies with Vietnam veterans has shown that the functions of cognitive function (general intelligence) and emotional intelligence share the same region of the brain (Barbey, Colom & Grafman, 2012). In terms of creativity, this suggests that the skills which are regarded as general intelligence should also include those regarded as emotional intelligence. The original list of general intelligence skills is just a little short. Dr. Barbey's work with lesion studies also extends to the brain architecture of executive function, fluid intelligence (Barbey, Colom, & Grafman, 2013) and executive function (Barbey, et al., 2012).

The theme of last year's International Neuropsychiatric Association Conference was the future of neuropsychiatry. Much was iterated about the changing roles of everyone involved in research and treatment of the neuropsychiatric conditions. Neil Pliskin eloquently presented this view of research and treatment with an interdisciplinary approach among psychologists and neuropsychiatrists in his lecture and presentation (Pliskin, 2013). Arne Dietrich has called for cooperation between creativity researchers and neuroimaging researchers (Dietrich, 2004a, 2004b). With the advent of the Human Neurconnectome Project, a picture of the future of studying how we think and of how we develop new ideas seems to be headed toward this interdisciplinary approach. The prospect of looking at the neurologic basis of creativity is eminently exciting.

Stuart Kauffman has referred to creativity as being on the 'edge of chaos' (Kauffman, 1995). In the case of TBI survivors, the starting point is well into the territory of chaos. Robert Bilder researched executive function in terms of balancing

stability and flexibility (Bilder, 2012). Here, again, the starting point in looking at TBI is much more on the uncomfortable side of flexibility than the unwavering nature of stability. The influence of these two researchers, along with my experience, has inspired my interest in convergent thinking.

Because I have fairly recently spent so much time in a more or less fluid state, the process of convergent thinking has become of particular interest to me. With the advent of numerous random word generators, i.e. www.tetfixer.com, www.wordgenerator.net, www.coyotecult.com, the possibilities for combining individual words, much of the groundwork for the beginnings of the ideation phase of the creative problem solving process can be generated by computers well beyond the possibilities of handful of minds in a facilitation session.

We are very close to a data-based world suggested in *The Singularity is Near: When Humans Transcend Biology* (Kurzweil, 2005) where the amount of data outstrips the capacity of the human brain. While, at first glance, this appears to be threatening, if we turn our focus toward convergent thinking and the skills necessary for intelligent selection and development of the vast array of divergent thought, the possibilities for an extended use of this part of CPS are numerous. Computer-generated random word combinations represent a glimpse into an enhanced view of divergent thinking. In my recent experience with CPS facilitation beyond what I have been doing with TBI survivors, I have seen a tendency for groups to converge on easily salable ideas that lack truly innovative novelty and novel value. In the world of artistic creativity, these ideas would be regarded as derivative. Time and time again, these groups have gone for the easy sell and passed up numerous novel ideas. This has led me to call for a new concept

that I call “audacious convergence.” In this variation of convergent thinking, when it seems the group has settle on some safe ideas on which to develop, those ideas are put aside and others from the less popular ideas are re-examined and “mini-developed” to see if these ideas in combination with others yield more novel ideas. Ultimately, this approach to convergent thinking can eliminate ‘safe’ selection of ideas and can lead to significantly more innovative thought.

In both groups of artistically creative people and groups of TBI survivors, the participants were much more interested in developing novel ideas. In several artistically creative groups, when they seemed to settle on what they termed “easy ideas,” they dismissed them. They then started the process of convergence again on the other less popular ideas, combining and recombining them until they had exhausted the standard combinations and ideas and come up with something quite novel. TBI survivors began this part of the process with their heads full of prescribed solutions for any number of problems. These prescribed solutions did not seem to adequately address their issues at hand; they wanted and needed something new to jumpstart the one-size-fits-all routines that filled their therapy sessions. Changing the paradigm in both these situations yielded a number of what I regarded as novel, useful ideas of value. That is creativity. Every day.

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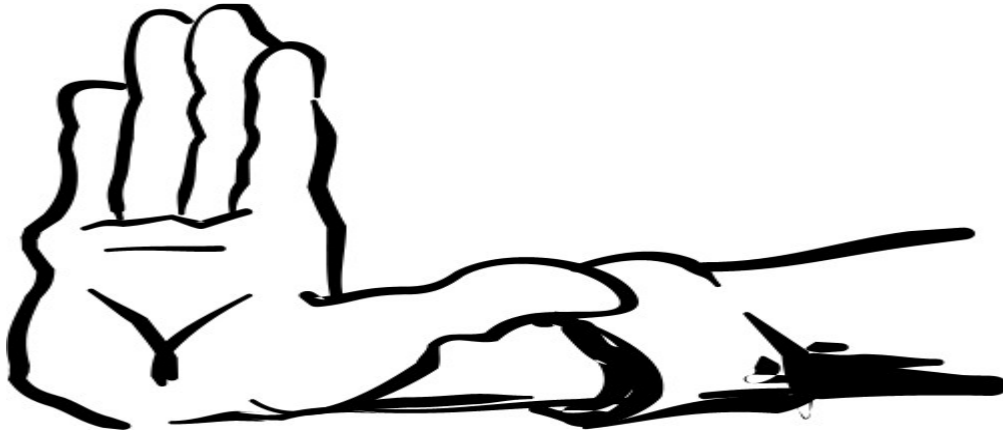
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APPENDICES

Appendix A: Prototypes of Tool Cards

Figure A1

Prototype for Drop Back 5, Give Me 5 Tool Card
Impulse control, Emotional inhibition



DROP BACK 5



Give Me 5

Figure A2

Plus 1, Minus 1 Tool Card Prototype
Information Gathering, Clarification
Plus 1, Minus 1

3 questions:

1) What challenges you right now?

-
- a)
 - b)
 - c)
 - d)
 - e)

2) What you might add to make it better?

- a)
- b)
- C)

Pick one and add it to your original challenge.

3) What you might leave behind to make it better? Use your list from #1.

- a)
- b)
- c)

Pick one and take it away.

4) Restate original challenge.

Figure A3

Break It Down, Build It Up Tool Card Prototype
Setting Prorities, Behavior , Ideation

BREAK IT DOWN, BUILD IT UP

What you **NEED** TO DO

What You **WANT** to DO

1. _____ 1. _____

2. _____ 2. _____

3. _____ 3. _____

4. _____ 4. _____

5. _____ 5. _____

Rearrange and remove as necessary. How might you proceed from here?

1. _____

2. _____

3. _____

4. _____

5. _____

Figure A4

Ruts and Rituals Tool Card Prototype
Mindfulness, Impulse Inhibition

Ruts, Rituals, Repetition

Ruts PLUS = RITUAL

What you do
automatically
without
thinking?

WHAT
MIGHT
YOU
MINDFULLY
RE-SET
THE
AUTOMATIC
SWITCH
IN
YOUR
MIND?

How might
you do the
same thing
in a new
way?

Practice with repetitions. The rut will grow into a ritual.

Figure A5

Write, Rinse Repeat Tool Card Prototype
Memory, Kinesthetic Learning

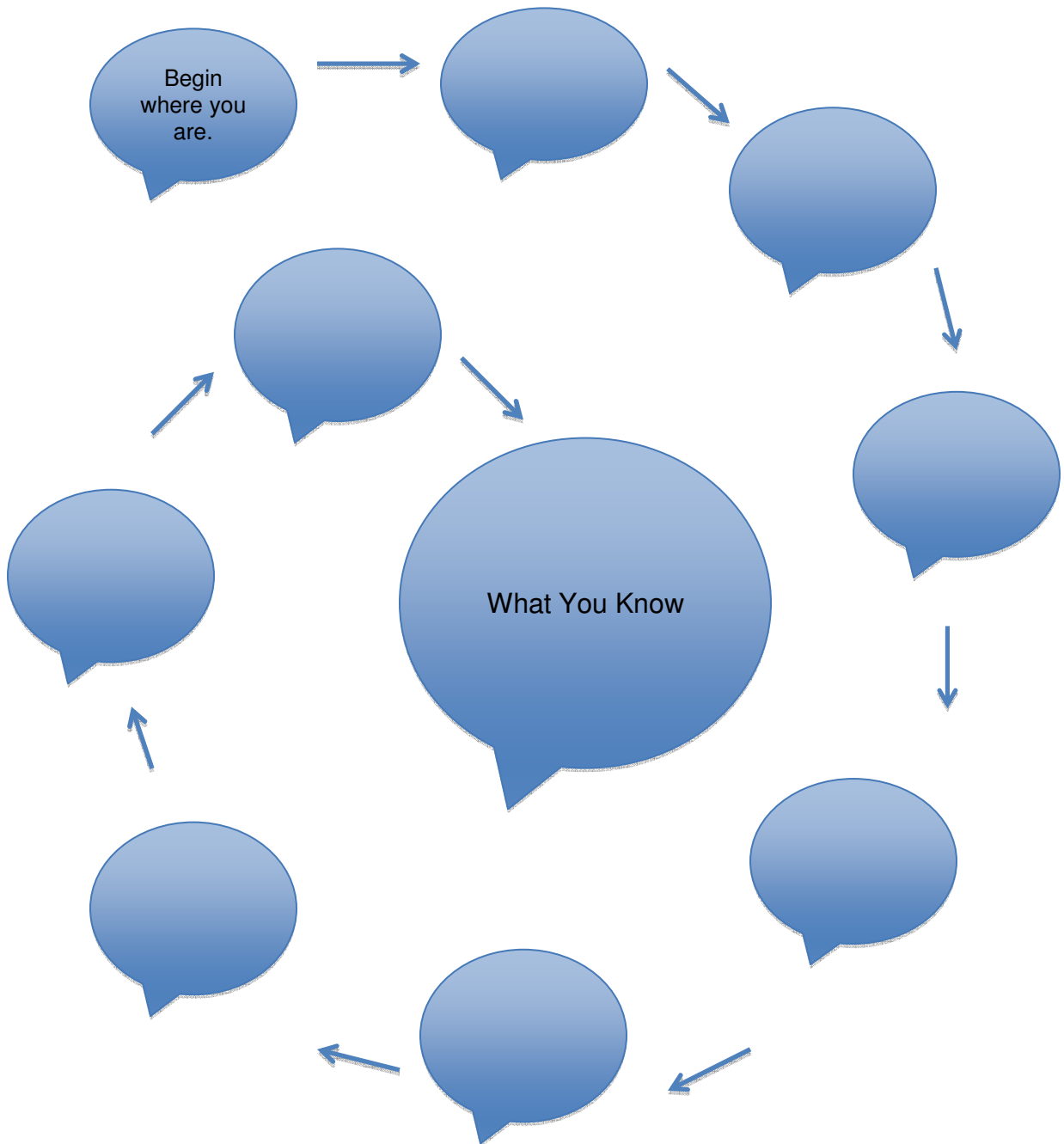
Write, Rinse, Repeat

1. Write something you might need or want to remember on the sticky side of a post-it note.
2. Walk away. 2 steps. 30 seconds.
3. Return. Remember if you can
4. What might remind you of what you wrote?
5. Say it out loud. Turn post-it over. Say it out loud again.
6. Repeat.
7. Increase time and distance with repetitions.
8. How might you think differently to remember?
9. Repeat.

Figure A6

Begin Where You Are Tool Card Prototype
Word Recall, Memory, Development

Begin Where You Are



Go Where You Know

Figure A7

A Single Petal Does Not A Flower Make Tool Card Prototype
Development, Cognitive Training

A SINGLE PETAL DOES NOT A FLOWER MAKE

1. On the center petal, write what you want.
2. On each of the outermost petals, write what might be your first step toward what you want.
3. What might be the next step? Write it on the next petals.
4. Repeat on the next petals.
5. Look at how far you have come.
6. Look at your journey back to your center.
7. Let this be your reminder.

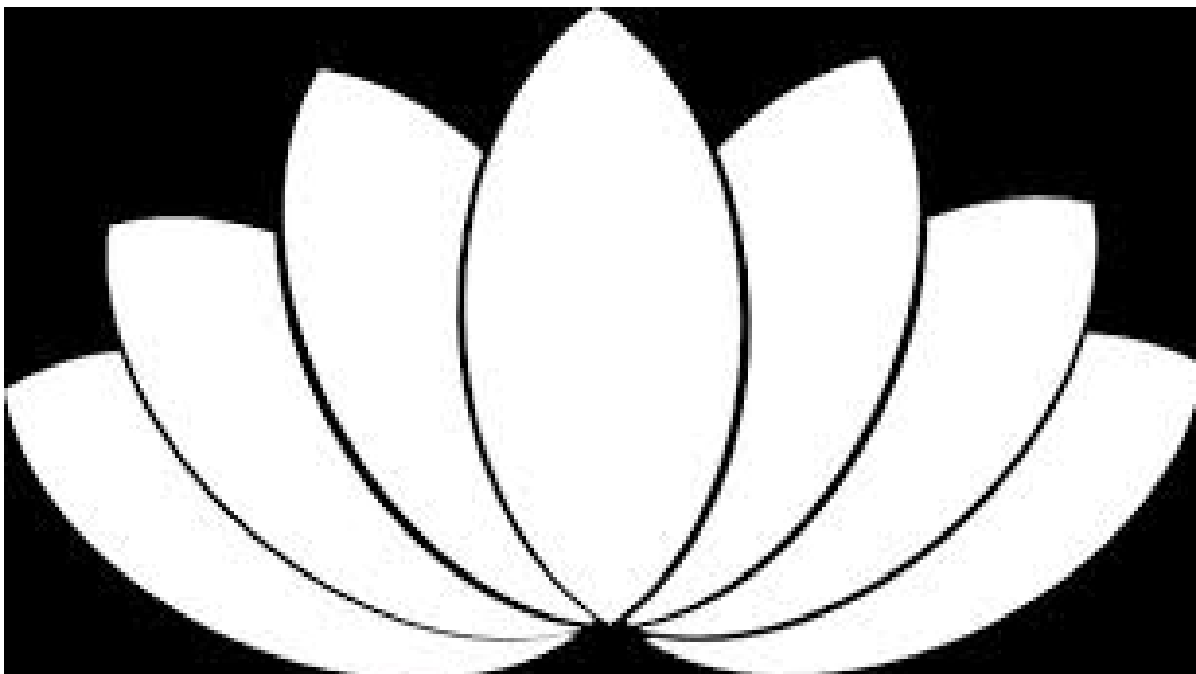


Figure A8

Plank Reading Tool Card Prototype

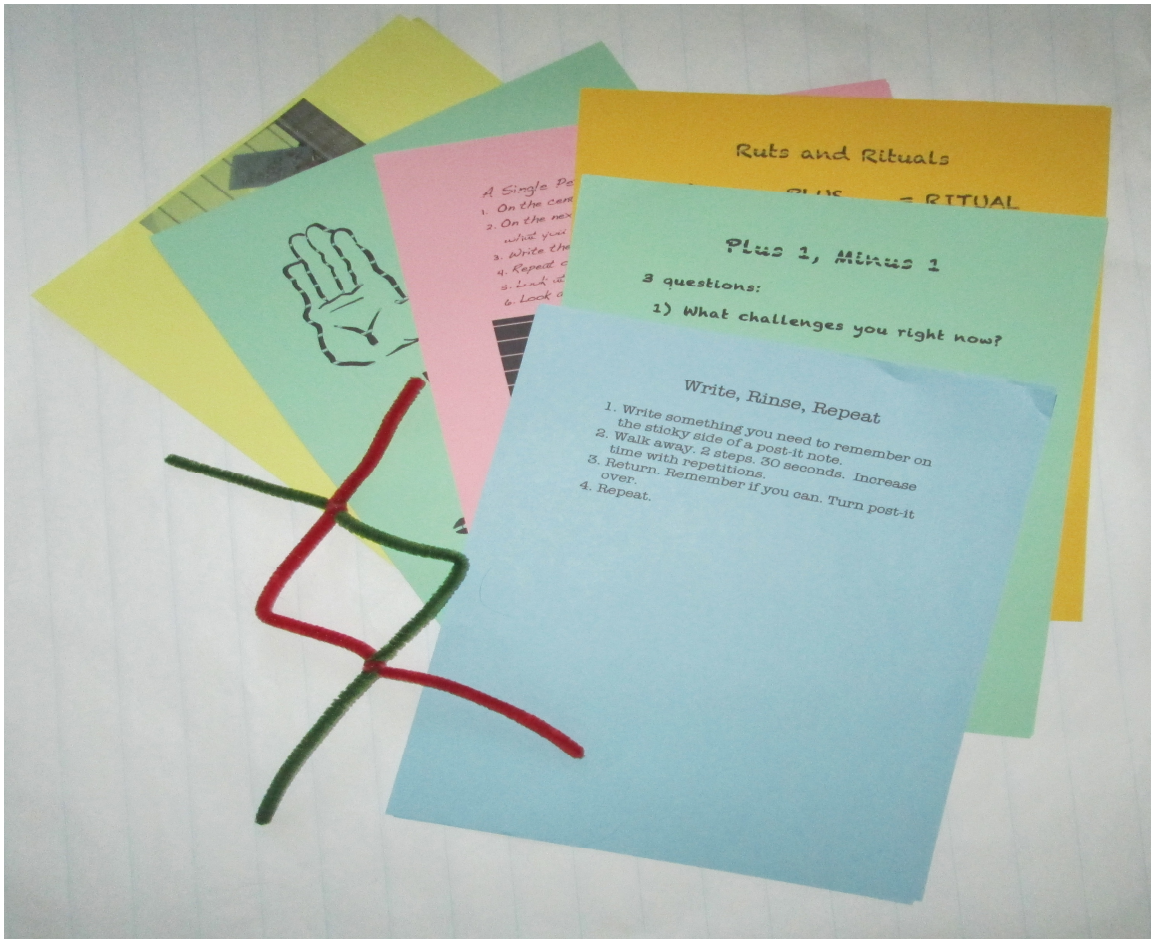
Kinesthetic Learning/ Concentration





Appendix B:

Illustration of Handouts for a Tool Kit Prototype Workshop



Appendix C.

Glossary

ABI- An acquired brain injury is an injury to the brain that has occurred after birth, but is not related to congenital defect or degenerative disease. Causes of ABI include (but are not limited to) hypoxia, illness, infection, stroke, substance abuse, toxic exposure, trauma, and tumor. ABI may cause temporary or permanent impairment in such areas as cognitive, emotional, metabolic, motor, perceptual motor and/or sensory brain function.

AOC- Alteration in Consciousness An **altered level of consciousness** is any measure of arousal other than normal.

CT Computerized tomography combines a series of X-ray views taken from many different angles and computer processing to create cross-sectional images of the bones and soft tissues inside your body. The resulting images can be compared to looking down

at single slices of bread from a loaf.

DOD Department of Defense

DIY Do it yourself

DIYAL Do It Yourself All Alone

Exploding head syndrome (EHS) is a form of hypnagogic auditory hallucination and is a rare and relatively undocumented parasomnia event in which the subject experiences a loud bang in their head similar to a bomb exploding, a gun going off, a clash of cymbals, ringing, an earthquake, or any other form of loud, indecipherable noise that seems to originate from inside the head.

fMRI (Functional Magnetic Resonance Imaging) is a functional neuroimaging procedure using MRI technology that measures brain activity by detecting associated changes in blood flow. This technique relies on the fact that cerebral blood flow and neuronal activation are coupled. When an area of the brain is in use, blood flow to that region also increases.

GCS The Glasgow Coma Scale is a neurological scale that aims to give a reliable, objective way of recording the conscious state of a person for initial as well as subsequent assessment. A patient is assessed against the criteria of the scale, and the resulting points give a patient score between 3 (indicating deep unconsciousness) and either 14 (original scale) or 15 (the more widely used modified or revised scale).

IOM The Institute of Medicine (IOM) is an American non-profit, non-governmental organization founded in 1970, under the congressional charter of the National Academy of Sciences

LOC Level of consciousness is a measurement of a person's arousability and responsiveness to [stimuli](#) from the environment

MVA Motor Vehicle Accident

MRI Magnetic resonance imaging, nuclear magnetic resonance imaging (NMRI), or magnetic resonance tomography (MRT) is a medical imaging technique used in radiology to investigate the anatomy and function of the body in both health and disease. MRI scanners use strong magnetic fields and radiowaves to form images of the body. The technique is widely used in hospitals for medical diagnosis, staging of disease and for follow-up without exposure to ionizing radiation.

OEF "Operation Enduring Freedom" is the official name used by the U.S. government for the War in Afghanistan, together with a number of smaller military actions, under the umbrella of the Global "War on Terror" (GWOT).

The operation was originally called "Operation Infinite Justice" (often misquoted as "Operation Ultimate Justice"), but as similar phrases have been used by adherents of

several religions as an exclusive description of God, it is believed to have been changed to avoid offense to Muslims, who are the majority religion in Afghanistan. U.S. President George W. Bush's remark that "this crusade, this war on terrorism, is going to take a while", which prompted widespread criticism from the Islamic world, may also have contributed to the renaming of the operation.[4]

The Operation comprises several subordinate operations:

Operation Enduring Freedom – Afghanistan (OEF-A)

Operation Enduring Freedom – Philippines (OEF-P, formerly Operation Freedom Eagle)

Operation Enduring Freedom – Horn of Africa (OEF-HOA)

Operation Enduring Freedom – Pankisi Gorge (completed in 2004)

Operation Enduring Freedom – Trans Sahara (OEF-TS; see also Insurgency in the Maghreb)

Operation Enduring Freedom – Caribbean and Central America (OEF-CCA)

OIF Operation Iraqi Freedom-The **Iraq War** was an armed conflict in Iraq that consisted of two phases. The first was an invasion of Iraq starting on 20 March 2003 by an invasion force led by the United States] It was followed by a longer phase of fighting, in which an insurgency emerged to oppose the occupying forces and the newly formed Iraqi government. The US completed its withdrawal of military personnel in December 2011. However, the insurgency is ongoing and continues to cause thousands of fatalities.

PCS Post-concussion syndrome, also known as post-concussive syndrome or PCS, is a set of symptoms that may continue for weeks, months, or occasionally a year or more after a concussion – a mild form of traumatic brain injury (TBI). The rates of PCS vary, but most studies report that about 15% of individuals with a history of a single mild TBI develop persistent symptoms associated with the injury. A diagnosis may be made when symptoms resulting from concussion last for more than three months after the injury.

The condition is associated with wide range of symptoms: physical, such as headache; cognitive, such as difficulty concentrating; and emotional and behavioral, such as irritability. Many of the symptoms associated with PCS are common or may be exacerbated by other disorders, so there is considerable risk of misdiagnosis.

PTA Post-traumatic amnesia (PTA) is a state of confusion that occurs immediately following a traumatic brain injury (TBI) in which the injured person is disoriented and unable to remember events that occur after the injury.[1] The person may be unable to state his or her name, where he or she is, and what time it is. When continuous memory returns, PTA is considered to have resolved. While PTA lasts, new events cannot be stored in the memory. About a third of patients with mild head injury are reported to have "islands of memory", in which the patient can recall only some events.[3] During PTA, the patient's consciousness is "clouded".[4] Because PTA involves confusion in addition to the memory loss typical of amnesia, the term "posttraumatic confusional state" has been proposed as an alternative.

Traumatic Brain Injury (TBI)

Table 1: Definition of Traumatic Brain Injury

Commonly used clinical case definitions of traumatic brain injury. Notes: *Traumatically induced refers to injuries that result from the head being struck, the head striking an object, and/or the brain undergoing an acceleration/deceleration movement without direct external trauma to the head; †Intracranial lesion, usually identified with computed tomography or magnetic resonance imaging of the brain, includes: diffuse axonal injury; traumatic intracranial hematomas or hemorrhage (epidural, subdural, subarachnoid, or intracerebral); cerebral contusions or lacerations; or penetrating cerebral injuries (e.g. gunshot wounds). ‡External force includes any of the following events: the head being struck by an object; the head striking an object; the brain undergoing an acceleration/deceleration movement without direct external trauma to the head; a foreign body penetrating the brain; forces generated from events such as a blast or explosion; or other forces yet to be defined. §Objective neuropsychological abnormalities are determined from mental status and neuropsychological examinations, and include disorders of mental status (eg, disorientation, agitation, or confusion) and other changes in cognition, behavior, or personality; importantly, this clinical case definition was developed for use by injury surveillance systems that anchor case ascertainment to the medical record of the hospital stay at the time of injury—and, therefore, refers to neuropsychological abnormalities that are documented in that medical record (ie, not those identified at a later date and/or in another setting). □Other evidence of brain pathology may include visual, neuroradiologic, or laboratory confirmation of damage to the brain; such evidence may enable a diagnosis of TBI when clinical consequences are delayed or subtle; clinical diagnosis is confounded by a difficult context (eg, battlefield TBI); or there is a need to differential TBI-induced clinical signs from those with other causes (eg, chemical warfare). CDE, common data elements; TBI, traumatic brain injury; PH, psychological health

American Congress of Rehabilitation Medicine (1993)

Traumatically induced* physiologic disruption of brain function, □as manifested by at least one of the following:

Any period of loss of consciousness

Any loss of memory for events immediately before or after the accident

Any alteration in mental state at the time of the accident □(eg, feeling dazed, disoriented, or confused)

Focal neurologic deficit(s) that may or may not be transient

Centers for Disease Control and Prevention (2002)

An occurrence of injury to the head that is documented in a medical record, with one or

more of the following conditions attributed to head injury:

Observed or self-reported (partial or complete) decreased level of consciousness

Amnesia (ie, loss of memory for events immediately preceding the injury, for the injury event itself, and for events subsequent to the injury)

Objective neuropsychological abnormality

Objective neurological abnormality

Diagnosed intracranial lesion Skull fracture

Department of Veterans Affairs and Department of Defense (2009)

Traumatically induced structural injury and/or physiological disruption of brain function as a result of an external force that is indicated by new onset or worsening of at least one of the following clinical signs, immediately following the event: Any period of loss or a decreased level of consciousness

Any loss of memory for events immediately before or after the injury (post-traumatic amnesia)

Any alteration in mental state at the time of the injury (confusion, disorientation, slowed thinking, etc.)

Neurologic deficits (weakness, loss of balance, change in vision, praxis, paresis/plegia, sensory loss, aphasia, etc.) that may or may not be transient intracranial lesion

International and Interagency Initiative toward CDE for Research on TBI and PH (2010) An alteration in brain function, or other evidence of brain pathology, caused by an external force. Alteration in brain function is defined as one of the following clinical signs:

Any period of loss of or decreased level of consciousness

Any loss of memory for events immediately before (retrograde amnesia) or after the injury (post-traumatic amnesia)

Any alteration in mental state at the time of the injury (confusion, disorientation, slowed thinking, etc)

Neurologic deficits (weakness, loss of balance, change in vision, dyspraxia, paresis/plegia [paralysis], sensory loss, aphasia, etc.)

Appendix D.
Further Reading

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